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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,866	09/29/2003	Robert F. Bartfai	TUC920030116US1	6307
35825	7590	05/02/2006	EXAMINER	
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2113

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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/674,866	<b>Applicant(s)</b> BARTFAI ET AL.	
	<b>Examiner</b> Amine Riad	<b>Art Unit</b> 2113	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on September.29 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-10,12-14 and 18-30 is/are rejected.
- 7) ☐ Claim(s) 7,11, and 15-17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.



#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)    | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) <br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **Detailed Action**

Claims 1-30 have been presented for examination.

Claims 1-6, 8-10, 12-14, and 18-30 have been rejected.

Claims 7,11, and 15-17 have been objected to.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 20-30 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 20-30 are not limited to tangible embodiments. In view of applicant's disclosure [specification page 15; paragraph 62; lines 5-9], the article of manufacture is not limited to tangible embodiments, instead being defined as including both tangible embodiment for example [solid-state memories, optical and magnetic disks] and intangible embodiments for example [carrier wave signals]. As such, the claim is not limited to statutory subject matter and is therefore non-statutory.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1,12 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Day  
US Patent Application Publication 2004/0034808.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

In regard to claims 1, 12, and 20

Day discloses a method of recovery from a data storage system failure in a data storage system having a host computer writing data to a first storage unit associated with a first storage controller synchronously mirroring the data to a second storage unit associated with a second storage controller asynchronously mirroring the data to a third storage unit, the method comprising:

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- Detecting a failure associated with the first storage unit; (Page 2; paragraph 25 “in the event of a failure or disaster at the primary site” this is interpreted as the system detects failures at the primary site)
- Writing data updates directly to the second storage unit;(Page 2; paragraph 25 “ committed updates are mirrored at the intermediate system in the event of a failure or disaster at the primary site”)
- Correcting the failure associated with the first storage unit; (Page 2; paragraph 25 “ committed updates are mirrored at the intermediate system in the event of a failure or disaster at the primary site”[the fact that updates are mirrored in the intermediate system in the event of a failure inherently suggests that the mirrored updates are used to correct the failure associated with the primary])
- Synchronously mirroring the data updates from the second storage unit to the first storage unit. (Page 3; paragraph 28 “ still further, the intermediate system 10 can transfer the mirror copy back to the primary controller 6 for storage” Since the data was sent synchronously from the primary to the intermediate, it will be the same from the intermediate to the primary)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 5, 6, 8,9,13, 14, 21, 24, 25, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Day Patent Application Publication 2004/0034808 in view of Crockett U.S. Patent No. 6,772,303.

In regard to claims 2, and 21

Day discloses a method of recovery from a data storage system as recited in parent claims 1, and 20.

Day does not disclose suspending the synchronous mirroring of the data from the first storage unit to the second storage unit upon detection of the failure associated with the first storage unit.

Crockett teaches suspending mirroring of the data from the first storage unit to the second storage unit upon detection of the failure associated with the first storage unit.

(Column 2; lines 36-39)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of suspending the mirroring of data from the first storage unit to the second storage unit upon detection of the failure associated with the first storage unit of Crockett into the method of data storage recovery of Day.

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One of ordinary skill in the art at the time the invention was made would have been motivated to make the combination because all the updates sent from the first storage unit to the second storage unit when the failure occurs could be corrupted.

In regard to claims 5,13, and 24

Day discloses a method of recovery from a data storage system as recited in parent claims 1, 12, and 20.

Day does not disclose creating a first map associated with the second storage unit, which identifies tracks that stores mirrored data, and continuously transmits batches of the mirrored data on tracks from the second storage to the third storage unit.

Crockett teaches creating a first map associated with the second storage unit, which identifies tracks that stores mirrored data, and transmits batches of the mirrored data on tracks from the second storage to the third storage unit. (Column 2; lines 47-49 ["this entry including a group-ID identifying the tracks written to backup storage" This is interpreted as creating a table which identifies tracks, and the back up storage is interpreted as third storage])

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of creating a first map associated with the second storage which identifies tracks storing mirrored data received by the second storage unit, and transmitting batches of the mirrored data on tracks from the second storage unit to the third storage unit of Crockett into the method of data storage recovery of Day.

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One of ordinary skill in the art at the time the invention was made would have been motivated to make the combination because all the updates sent from the first storage unit to the second storage unit when the failure occurs could be corrupted.

In regard to claims 6, 14, and 25

Day discloses a method of recovery from a data storage system as recited in parent claims 1, 12, and 20.

Day does not disclose creating a second map associated with the second storage unit, which identifies tracks that stores changed data from a point in time where the host computer began writing directly to the second storage unit.

Day does not disclose copying to the first storage unit the changed data on the tracks identified by the second map, and synchronously mirroring to the first storage the changed data written to the second storage unit until full duplex is reached between the first and second storage unit.

Crockett teaches creating a second map associated with the second storage unit, which identifies tracks that stores changed data from a point in time where the host computer began writing directly to the second storage unit. (Column 2; line 42-43 [accessing the table comes after creating it])

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Crockett teaches

- Copying to the first storage unit the changed data on the tracks identified by the second map (Column 2; line 54 [dynamic resynchronization]),
- Synchronously mirroring to the first storage the changed data written to the second storage unit until full duplex is reached between the first and second storage unit.(Column 3; line 23-24 [when the are received during resynchronization the system reaches its full duplex because the re-synchronization is done from second storage unit to first storage unit while the updates received are mirrored from the primary to the second storage unit])

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of creating a second map associated with the second storage which identifies tracks storing mirrored data from a point in time, copying to the first storage unit the changed data identified by the second map, and synchronously mirroring to the first storage unit changed data written to the second storage unit of Crockett into the method of data storage recovery of Day.

One of ordinary skill in the art at the time the invention was made would have been motivated to make the combination because all the updates sent from the first storage unit to the second storage unit when the failure occurs could be corrupted.

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In regard to claims 8, and 27

Day discloses a method of recovery from a data storage system as recited in parent claims 1, and 20.

Day does not disclose continuing to identify the tracks having the data updates with the first map and with the second map, and synchronously copying the data updates on the tracks identified by the first map from the second storage unit to the first storage unit.

Crockett teaches continuing to identify the tracks having the data updates with the first map and with the second map, and synchronously copying the data updates on the tracks identified by the first map from the second storage unit to the first storage unit.

(Column 8; line 12-20 [examiner notes that the operation is done in reverse order (the first storage unit copies the data to the second storage unit so that the second storage unit is able to recover)])

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of continuing to identify the tracks having the data updates with the first map and with the second map, and synchronously copying the data updates on the tracks identified by the first map from the second unit to the first storage unit of Crockett into the method of data storage recovery of Day.

One of ordinary skill in the art at the time the invention was made would have been motivated to make the combination because continuing to identify tracks with updates and copying these updates to the first failed storage would expedite the recovery process.

In regard to claims 9, and 28

Day discloses a method of recovery from a data storage system as recited in parent claims 1, and 20.

Day does not disclose terminating the use of the first map to identify the tracks associated with the second storage unit storing the data updates, and continuing to use the second map to identify the tracks associated with the second storage unit storing changed data.

Crockett teaches terminating the use of the first map to identify the tracks associated with the second storage unit storing the data updates, and continuing to use the second map to identify the tracks associated with the second storage unit storing changed data.  
(Column 2;line 63-67)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of terminating the use of the first map to identify the tracks associated with the second storage unit storing the data updates, and continuing to use the second map to identify the tracks associated with the second storage unit storing changed data of Crockett into the method of data storage recovery of Day.

One of ordinary skill in the art at the time the invention was made would have been motivated to make the combination because continuing to identify tracks with updates

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and copying these updates to the first failed storage would expedite the recovery process.

Claims 3, 4, 18, 19, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Day in view of LeCrone Patent Application Publication 2004/0039959.

In regard to claims 3, 18, 22

Day discloses a method of recovery from a data storage system as recited in parent claims 1, 12, and 20.

Day does not disclose suspending the asynchronous mirroring of the data updates from the second storage unit to the third storage unit while mirroring data from the second storage unit to the first storage unit.

LeCrone teaches suspending the asynchronous mirroring of the data updates from the second storage unit to the third storage unit while mirroring data from the second storage unit to the first storage unit (Page 14; Paragraph 157) and Figure 21b

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of suspending the asynchronous mirroring from the second storage unit to the third storage unit while mirroring from the second storage unit to first storage unit of LeCrone into the method of data storage recovery of Day

One of ordinary skill in the art at the time the invention was made would have been motivated to make the combination because mirroring data to third storage unit requires

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is asynchronous (do not rely on time), and consequently could take a long time to be finished while this time is valuable during recovery.

In regard to claims 4, 19, 23

Day discloses a method of recovery from a data storage system as recited in parent claims 1, 12, and 20.

Day does not disclose

- Re-establishing the synchronous mirroring of the data from the first storage unit to the second storage unit
- Resuming writing the data from the host computer to the first storage unit
- Re-establishing the asynchronous mirroring of data from the second storage unit to the third storage unit

LeCrone teaches

- Re-establishing the synchronous mirroring of the data from the first storage unit to the second storage unit
- Resuming writing the data from the host computer to the first storage unit
- Re-establishing the asynchronous mirroring of data from the second storage unit to the third storage unit

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Figure 33 and (Page 17; paragraphs 175 and 176) show how the system is reconfigured to begin using the primary as the origination of the starting point, which means that the host sends the updates to the first storage unit, in turn the first storage unit is mirrored by the second storage unit, and finally the third storage unit mirrors the second storage unit.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of bringing the system to normal state of LeCrone into the method of data storage recovery of Day.

One of ordinary skill in the art at the time the invention was made would have been motivated to make the combination because the interrupted process needs to be finished, and completed.

Claims 10, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Day in view of Crockett, and further in view of Kern US Patent 5,870,537

In regard to claims 10, and 29

Day/Crockett disclose a method of recovery from a data storage system as recited in parent claims 1, and 20.

Day/Crockett do not disclose that the host computer is quiesced after the full duplex state between the first storage unit and the second storage unit is reached.

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Kern teaches that the host computer is quiesced after the full duplex state between the first storage and the second storage unit is reached. (Column 5; line 2-10)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of quiescing the host computer after the full duplex state between first and second storage unit is reached of Kern into the method of data storage recovery of Day.

One of ordinary skill in the art at the time the invention was made would have been motivated to make the combination because continuing to identify tracks with updates and copying these updates to the first failed storage would expedite the recovery process.

#### ***Allowable Subject Matter***

Claims 7, 11, 15, 16, and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Patent Application 2004/0236983 teaches most of the limitations, but misses that the failure happens in the local storage, on the other hand U.S. patent 5,889,935 contains some elements, but lacks an important element, which is asynchronously mirroring the updates to a third storage unit. See PTO 892.

## **Contact**


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amine Riad whose telephone number is 571-272-8185. The examiner can normally be reached on 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on 571-272-3645. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AR  
Patent Examiner



  
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